REMARKS

Reconsideration and further examination of this application is hereby requested. Claims 30-66 are currently pending in the application. Claims 1-29 have been canceled.

A. Allowed Claims 30 and 50-55

Applicant appreciates the allowance of claim 30. Applicant notes that claim 30 as allowed a typographical error in that "camera" was misspelled as "cameral." The amendment of claim 30 serves to correct this error.

Claims 50-55 have not been rejected on any basis. Accordingly, Applicant respectfully submits that claims 50-55 recite allowable subject matter.

B. Objection to Claims 31 and 32

Claims 31 and 32 have been objected to as not further limiting claim 30 from which they depend. This objection is not understood. It appears to Applicant that claims 31 and 32 each recite limitations that do not appear in 30. Accordingly, Applicant respectfully asks that the Examiner withdraw this objection.

C. The Obviousness Rejections

Claims 33-49 and 56-66 have been rejected under 35 U.S.C. § 103(a) as being obvious over *Toh* (US 6141040) in view of *Kaplan* (US 6096567). This rejection is respectfully traversed based on

the following arguments.

C.1. The Ball Grid Array Limitations

In order for a patent claim to be obvious, the prior art must teach or fairly suggest each and every limitation of that claim. That is because the claim must be considered as a whole.

Independent claim 33 recites a method for

> three dimensional inspection of a lead on a ball array device

at lines 1-2. Independent method claim 50 (from which claims 56-66 depend) recites a similar limitation.

The measurement system disclosed by *Toh* cannot possibly be used to practice a method for inspection of ball array device leads because the two views that are taken of the device leads are orthogonal. Only an oblique view would work for inspecting leads on a ball array device because the inner rows of leads would be obscured by the outermost row of leads in an orthogonal view such as that taken by *Toh*.

The *Kaplan* reference does not recitify this shortcoming of *Toh*. There is no teaching in Kaplan of an oblique view so as to enable *Toh* to be useful for practicing methods of inspecting the leads of ball array devices.

Accordingly, it is respectfully submitted that the teachings of Toh and Kaplan are not sufficient to meet all the limitations

recited in the rejected claims.

C.2. Not Obvious to Combine *Toh* and *Kaplan*

The Examiner concedes that the *Toh* reference "fails to specifically mention about converting the first and second lead reference pixel positions into a world value by using pixel values and parameters determined during a calibration." This is true. There is no provision made in the system disclosed by *Toh* for calibrating the pixels to world values because there is no calibration of the sensors. To rectify this discrepancy in the *Toh* disclosure, the Examiner contends that it

> would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the teaching of step converting the first and second lead reference pixel positions into a world value by using pixel values and parameters determined during a calibration as taught by Kaplan's into the system of Toh.

See paper no. 17 at page 12, lines 8-12.

However, to combine the teachings of the *Toh* and *Kaplan* references as urged by the Examiner would not have made sense. Because they use entirely different position measurement systems, it would have made no sense technically to modify *Toh* to calculate position as *Kaplan* does.

The *Toh* reference has a single camera that obtains a two view image of plural contacts of a device package under test. In

contrast, the *Kaplan* reference utilizes two cameras; one downward-looking camera that obtains a single view image of plural contacts of a device package under test and the other upward-looking camera that obtains a single view of a pin probe that is capable of making contact (via relative movement) with the plural contacts of the device package under test. This means that all of the pixel data obtained via the *Toh* system pertains to the plural contacts of the device package under test, whereas the pixel data obtained via *Kaplan's* system is a mixture of that pertaining to the plural contacts of the device package under test (from its downward-looking camera) and that pertaining to the pin probe (from its upward-looking camera). Because the data sets are so radically different, it would have been counterintuitive, if not outright impossible, to have used position calculation techniques developed to suit the *Kaplan* measurement system to work for the diverse *Toh* system.

Thus, the modification urged by the Examiner would not have been obvious to a person having ordinary skill in the art.

In any case, although the *Kaplan* disclosure does mention an "X,Y calibration" using a "small cross hair fiducial" or an "automatically inserted reticle," this would not be very useful for converting a pixel position into a world value since it is only a two dimensional calibration, not three dimensional. The

sort of calibration taught by *Kaplan* appears to be useful for coordinating the relative positioning of two opposed cameras with respect to one another by placing a fiducial mark between them that both can use as a reference. Note that this does nothing to help with compensating for distortions in the optics across the field of view as is done by the present invention.

C.3. The Identified Motivation Is Not Relevant

Moreover, the motivation identified by the Examiner as being a reason to make the modification (lines 29-32 of col. 3 of *Kaplan*) are not relevant to what is claimed and to what is being done in the *Toh* reference. Rather than attempting to ascertain a world value for a package lead, *Kaplan* simply sets the low expectations of determining "the position coordinates of a probe array and the position coordinates of a first die with sufficient accuracy." *See Kaplan* at col. 3, lines 30-32. Upon review of the fuller *Kaplan* disclosure that this goal simply refers to how the probe array and the die are positioned relative to one another in X-Y space.

Thus, the identified motivation lacks sufficient vision or ambition to be a teaching of what is claimed.

For the above reasons, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 33-49 and 56-66.

D. Closing

For the above reasons, Applicant respectfully submits that the application is in condition for allowance with claims 30-66. If there remain any issues that may be disposed of via a telephonic interview, the Examiner is kindly invited to contact the undersigned at the local exchange given below.

The Director of the U.S. Patent & Trademark Office is authorized to charge any necessary fees, and conversely, deposit any credit balance, to Deposit Account No. 18-1579.

Respectfully submitted,

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